Hazardous Substances Emergency Events Surveillance Program

First Responder Injuries From Non-Petroleum Hazardous Substances Emergency Events in Washington State, 1995-2000

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FIRST RESPONDER INJURIES FROM NON-PETROLEUM HAZARDOUS SUBSTANCES EMERGENCY EVENTS IN WASHINGTON STATE, 1995-2000

The Hazardous Substances Emergency Events Surveillance (HSEES) program, sponsored by the Agency for Toxic Substance and Disease Registry (ATSDR), tracks non-petroleum emergency chemical releases. Washington State has been involved in the HSEES program since its inception in 1991. Beginning in 1995, HSEES began keeping specific data on injuries to responders related to these events. By tracking this information it is hoped that there will be increased understanding of the risks associated with these events so that future injuries can be minimized or avoided altogether.

I. LAW ENFORCEMENT OFFICERS

During the years 1995 through 2000, a total of 75 law enforcement officers from eleven counties were injured in 36 non-petroleum emergency chemical release events. Of these, 68 (91%) were males and 7 (9%) were females. There was a wide variance from one year to the next in the number of officers injured and the number of "officer-injury events" reported, with a "spike" in 1999. Thirty-one percent of all officer injuries and 42% of all officer-injury-events occurred in that year. This anomaly was due almost entirely to the increase in clandestine methamphetamine lab activity. There were a total of 19 events (53%) in which officers were injured because of meth labs during the six-year period. Ten of those events (28%) occurred in 1999. Table 1 shows the distribution by county and year of law enforcement officers injured during HSEES events. Numbers in parenthesis are officer-injury events. (For example, there were six officers injured in Snohomish County in 1995. All six injuries occurred during a single event.)

Table 1. Police officers injured (officer injury events) during HSEES events by county, by year, 1995-2000.

COUNTY	1995	1996	1997	1998	1999	2000	TOTALS
KING	12 (2)			2 (1)	9 (6)	1 (1)	24 (10)
PIERCE	1 (1)	3 (2)		10 (2)	7 (5)		21 (10)
SNOHOMISH	6 (1)	2 (1)			1 (1)	1 (1)	10 (4)
THURSTON			3 (1)			3 (2)	6 (3)
SKAGIT					4 (1)		4 (1)
COWLITZ			3 (2)				3 (2)
WALLA WALLA		3 (2)					3 (2)
KITSAP				1 (1)			1 (1)
LEWIS						1 (1)	1 (1)
WHATCOM					1 (1)		1 (1)
WHITMAN					1 (1)		1 (1)
TOTALS	19 (4)	8 (5)	6 (3)	13 (4)	23 (15)	6 (5)	75 (36)

Table 2 shows the severity of injuries sustained by officers during HSEES events. Most of the officers injured (73%) were treated at hospital emergency rooms and released. Of the remainder, nine (12%) were treated at the scene, nine (12%) were hospitalized for observation only, and two (3%) saw private physicians within 24 hours of the event. There were no fatalities.

Table 2. Severity of injuries to police officers during HSEES events, 1995-2000.

Type of medical treatment	Number treated (%)
Emergency Room: Treated & Released	55 (73%)
Treated at the Scene	9 (12%)
Admitted to Hospital for Observation	9 (12%)
Saw Private Physician within 24 hrs.	2 (3%)
Total	75 (100)

Injuries reported by law enforcement officers during HSEES events during period 1995-2000 are shown in Table 3. By far the most frequently reported type of injury to police officers was respiratory irritation (53%) including breathing problems, coughing, wheezing, sore throat and shortness of breath. Eye irritation was the second most-frequently reported problem (16%), followed by headache (12%), gastrointestinal problems (6%), central nervous system (CNS) problems (5%) and skin irritation (4%). Another 4% of injuries included chemical burn, heat stress and thermal burn.

Table 3. Police officer injuries by type of injury sustained during HSEES events, 1995-2000.

Respiratory Irritation / Shortness of Breath	Eye Irritation	Headache	Gastro-intestinal Irritation	CNS Problems	Skin Irritation	Other** Injuries	Total Injuries Reported*
62 (53%)	19 (16%)	14 (12%)	7 (6%)	6 (5%)	5 (4%)	4 (3%)	117 (100%)

* Number of injuries is greater than number of individuals injured because some officers had more than one injury.
** Chemical burn (3), Heat stress (1), Thermal burn (1).

King County, with the highest overall population in the state, had the highest number of law enforcement officer injuries as well as injury-events; a total of 24 injuries in 10 events. Pierce County ran a close second with 21 officers injured in 10 events. By taking the total number of HSEES events for each of the eleven counties, a rate of officers injured per 1000 events was computed. A similar rate was computed using only HSEES events in which injuries were reported. The average rate at which officers were injured for all HSEES events was 47 per thousand events. When limited to only those events in which injuries were reported, the average was 167 per thousand events. Five counties (Pierce, Snohomish, Thurston, Skagit and Walla Walla) had a noticeably greater than average likelihood of officers becoming injured during a HSEES event. That pattern existed whether the comparison was with all events or was limited to injury events. Table 4 shows this relationship; counties with higher rates are shown in bold type.

Table 4. Police officers injured and officer injury HSEES events by county with comparisons to total county events and total county injury events, 1995-2000.

COUNTY	Officers Injured	Officer Injury Events	Total HSEES Injury Events	Total HSEES Events	Officers Injured/ Total Events* (Per 1000 Events)	Officers Injured/ Injury Events** (Per 1000 Events)
KING	24	10	203	682	35	118
PIERCE	21	10	79	219	**96**	**266**
SNOHOMISH	10	4	52	150	**67**	**192**
THURSTON	6	3	16	61	**98**	**375**
SKAGIT	4	1	13	72	**56**	**308**
COWLITZ	3	2	25	176	17	120
WALLA WALLA	3	2	13	31	**97**	**231**
KITSAP	1	1	16	49	20	63
LEWIS	1	1	7	20	50	143
WHATCOM	1	1	15	105	10	67
WHITMAN	1	1	9	24	42	111
TOTALS	75	36	448	1589	47	167

* Rates computed using the total number of HSEES events in the county multiplied by 1000.
** Rates computed using the total number of HSEES events associated with injuries in the county multiplied by 1000.

April and May were the months having the greatest portion of police officer injuries. A total of 11 (31%) of the 36 events occurred in those months. Weekends were noticeably safer than average accounting for only 14% of injury events; Mondays were the most dangerous with 10 (28%) events.

II. FIRE DEPARTMENT PERSONNEL

During the years 1995 through 2000, 56 firefighters from 11 counties were injured responding to non-petroleum emergency substance releases in Washington State. Of those whose sex was recorded, 50 (91%) were male and 5 (9%) were female. Table 5 uses the level of medical care received as an indicator of the severity of injuries. Most injured firefighters (61%) were taken to hospital emergency rooms, treated and released. Nine firefighters (16%) were treated at the scene, five (9%) were admitted to the hospital (four for treatment, one for observation), four (7%) saw private physicians and four (7%) experienced and reported symptoms within 24 hours of the event.

The most frequently reported injury was respiratory irritation (31%), followed by gastrointestinal irritation (17%), headache (11%) and central nervous system problems (10%). Less frequently reported injuries made up the remaining 30 percent of the injuries and included eye irritation, skin irritation, chemical burn, trauma, heat stress, chest pain and thermal burn.

Table 5. Severity of injuries to firefighters during HSEES events, 1995-2000.

Type of medical treatment	Number treated (%)
Emergency Room: Treated & Released	34 (61)
Treated at the Scene	9 (16)
Admitted to Hospital for treatment	4 (7)
Saw Private Physician	4 (7)
Experienced symptoms within 24 hrs.	4 (7)
Admitted to Hospital for Observation	1 (1)
Total	56 (100)

Table 6. Firefighter injuries sustained while responding to HSEES events, 1995-2000.

RESPIRATORY IRRITATION/ SHORT OF BREATH	GASTRO-INTESTINAL IRRITATION	HEADACHE	CENTRAL NERVOUS SYSTEM PROBLEMS	OTHER INJURIES*	TOTAL INJURIES REPORTED**
27	15	10	9	26	87

* Eye irritation (6), skin irritation (6), chemical burn (4), trauma (4), heat stress (3), chest pain (2), thermal burn (1).
** Number of injuries is greater than number of individuals injured because some firefighters had more than one injury.

Nearly half (45%) of all firefighters injured in Washington State during HSEES events were injured in King County. Of the total number of HSEES events in which a firefighter was injured, 42% occurred in King County. The main reason for this is that King County had a much larger share of HSEES events in which there were injuries than did other counties. Table 7 shows the distribution of firefighters injured by county and by year.

Table 7. Firefighters injured (firefighter injury events) during HSEES events by county, by year, 1995-2000.

COUNTY	1995	1996	1997	1998	1999	2000	TOTALS
KING	9 (3)		3 (1)	4 (3)	6 (5)	3 (1)	25 (13)
SNOHOMISH		1 (1)			2 (2)	3 (1)	6 (4)
BENTON	5 (2)			1 (1)			6 (3)
PIERCE			2 (1)		1 (1)	2 (2)	5 (4)
MASON						4 (1)	4 (1)
CHELAN						3 (1)	3 (1)
SPOKANE				2 (1)			2 (1)
ISLAND				2 (1)			2 (1)
GRAYS HARBOR			1 (1)				1 (1)
PACIFIC		1 (1)					1 (1)
YAKIMA	1 (1)						1 (1)
TOTALS	15 (6)	4 (3)	6 (3)	7 (5)	9 (8)	15 (6)	56 (31)

Although King County had 203 events involving injuries (42%) and 682 total HSEES events (44%), King County was only slightly above average in its rate of firefighters injured per event. Counties that experienced above-average rates are shown in bold type in Table 8. Although several counties had much higher rates than King County, the numbers were too small to make these rates meaningful. This is illustrated by viewing Table 7 which shows that Island and Mason counties, both of which had far higher than average rates of firefighters injured during HSEES events, were both totally free of such incidents in five out of the six years studied.

Table 8. Firefighters injured and firefighter injury HSEES events with comparisons to total HSEES events and total HSEES injury events, by county, 1995-2000.

COUNTY	Firefighters Injured	Firefighter Injury Events	Total HSEES Injury Events	Total HSEES Events	Firefighters injured / Total Events * (per 1000 events)	Firefighters Injured / Injury Events ** (per 1000 events)
KING	25	13	203	682	**36.7**	**123.2**
SNOHOMISH	6	4	52	150	**40**	**115.4**
BENTON	6	3	38	179	33.5	**157.9**
PIERCE	5	4	79	219	22.8	63.3
MASON	4	1	2	8	**500**	**2000**
CHELAN	3	1	12	32	**93.8**	**250**
SPOKANE	2	1	44	137	14.6	45.5
ISLAND	2	1	3	7	**285.7**	**666.7**
GRAYS HARBOR	1	1	19	50	20	52.6
PACIFIC	1	1	3	7	**142.9**	**333.3**
YAKIMA	1	1	32	85	11.8	31.3
TOTAL	56	31	487	1556	**35.9**	**115**

* Rates computed using the total number of HSEES events in the county multiplied by 1000.
** Rates computed using the total number of HSEES events associated with injuries in the county multiplied by 1000.

Of the total 31 injury events involving firefighters, only four involved clandestine methamphetamine labs. These events occurred in 1998 (1 event), 1999 (1 event) and 2000 (2 events).

No one chemical or chemical group was involved in a disproportionate number of events, although during the years 1995 and 1996 firefighter injury events were somewhat more likely to be related to pesticides and during 1999 and 2000 solvent events were more prevalent. April, with six events (19%), was the worst month for firefighter injuries and February was the safest month with no HSEES events involving firefighter injuries. Over half of all firefighter injury events [16(52%)] occurred in the months April through July.

Private residences and food processing plants were the most likely sites of firefighter injuries. The distribution of firefighter injury events by site is shown in Table 9.

Table 9. Distribution of firefighter injury HSEES events by location of event*.

Location	1995	1996	1997	1998	1999	2000	Totals
Private residences				1	2	3	6
Food processing	2	1	1	1	1		6
Agricultural production	1	1		1		1	4
Public services**			1		3		4
Chemical companies***	1				1	1	3
Construction/trades				1	1	1	3
Food/drink establishments	1			1			2
Semiconductor mfg			1				1
Recreational facility		1					1
Totals	6	3	3	5	8	6	30

* There was one event which could not be classified by location.
** Includes hospital, fire dept, sanitary services and university.
*** Includes chemical distributor, solvent recycler.

Figures 1-3 shown at the end of this report show the distribution of all HSEES events in which first responders were injured by month, day and time of day.

For additional copies of this report or to obtain other information on releases of hazardous chemicals in Washington State, please contact the Washington State Department of Health, Office of Environmental Health and Safety, HSEES Program, 7171 Cleanwater Lane, Building 4, P.O. Box 47825, Olympia, WA 98504-7825, (360) 236-3387.

Figure 1. HSEES injury events involving first responders in Washington State by day of week, 1995-2000.

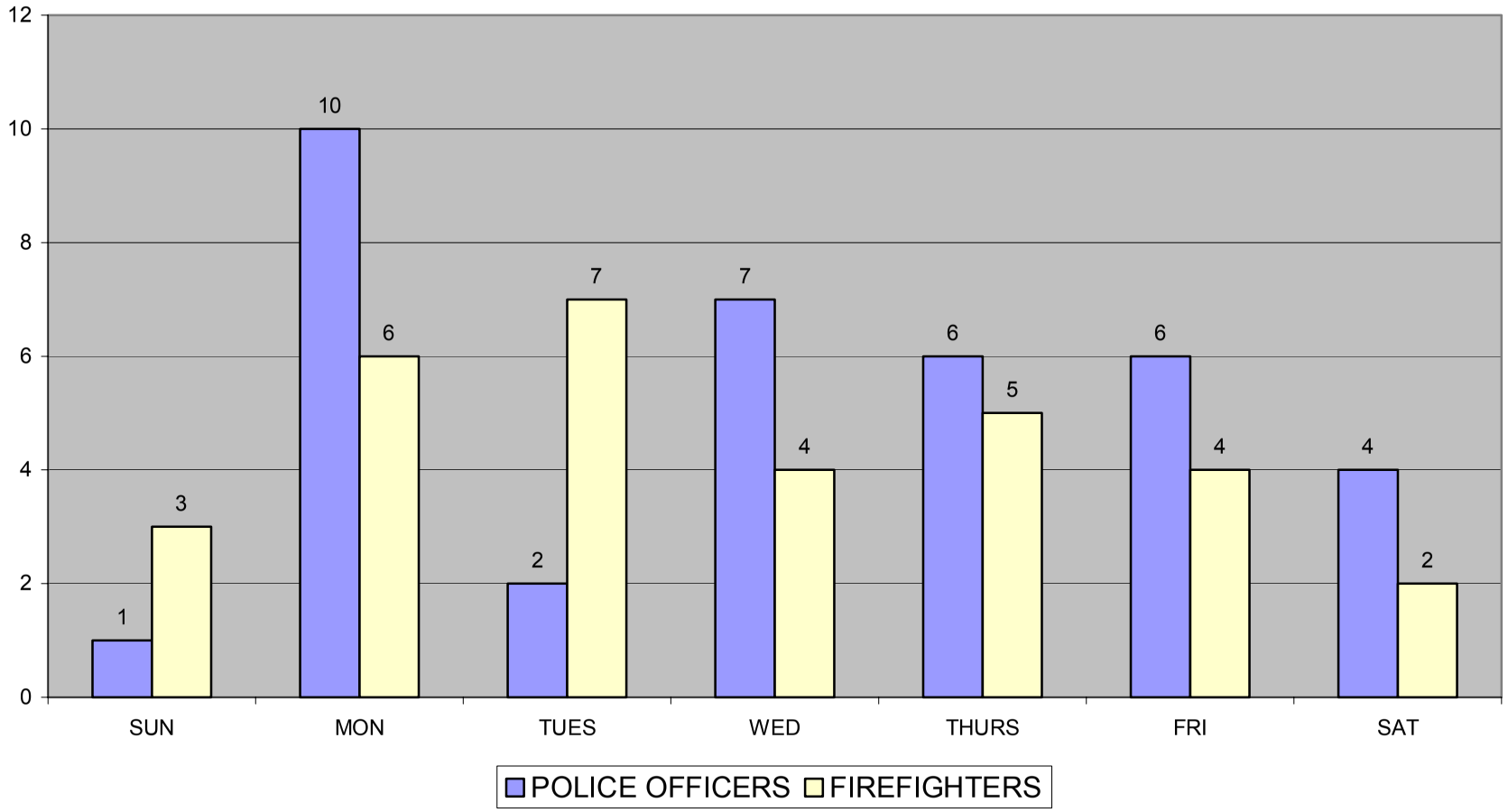

Figure 2. HSEES injury events involving first responders in Washington State by month, 1995-2000.

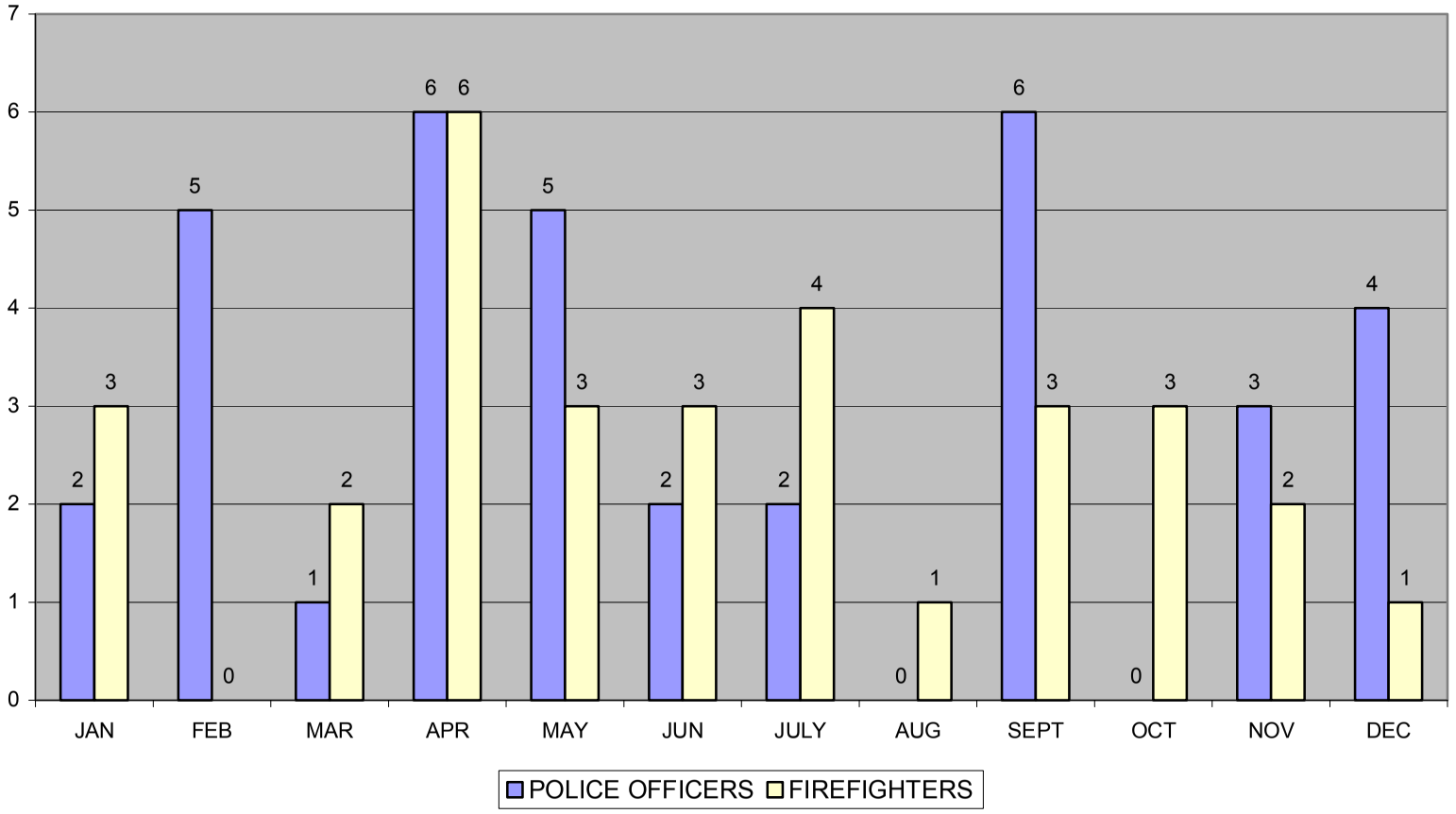

Figure 3. HSEES injury events involving responders in Washington State by time of day, 1995-2000.